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10/551,774	10/03/2005	Ian Robert Wheeler	860576.00002	4722

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EXAMINER

PARVINI, PEGAH

ART UNIT	PAPER NUMBER
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1755

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/551,774

Applicant(s)

WHEELER ET AL.

Examiner

Pegah Parvini

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. <u>20070817</u> . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>20051003</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claim 20 is objected to because of the following informalities: "clam 19" should be corrected as "claim 19". Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recite the limitation that the fluid is "other than alcohol or esters"; however, claims 13 and 14 recite the limitation of using glycols, which is known in the art as an alcohol, in their limitations. It is unclear whether the milling fluid that the applicants claim, is an alcohol or not.

For the purposes of examination the claim 1 is assumed to include alcohols as well.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 4-9, 17-20, 23-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 4,725,317 to Wheeler.

6. Regarding claim 1, Wheeler teaches a process for preparing low or non-dusting substantially non-volatile metal pigment composition having a coherent paste comprising an organic binder medium, an organic liquid vehicle and metal pigment in powder or flake form (Abstract; column 1, lines 64-68). Also, Wheeler discloses that the composition can be used in wet ball milling (column 2, lines 19-21).

Wheeler, further, discloses that any organic liquid or mixture or liquids which is chemically inert with respect to the metal powder and the binder material and which has a boiling point which is below the boiling point of any liquid binder used as such or formed by melting during removal of organic liquid vehicle may be employed (column 2, lines 61-68). In addition, Wheeler discloses that the metal pigment may be aluminum or bronze (column 3, lines 54-56).

Therefore, it would have been obvious to have selected a fluid that is both solvent and water miscible other than esters.

7. Regarding claim 4, Wheeler discloses that the metal flakes produced are separated so that the desired particle size distribution is obtained (column 2, lines 23-

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26). Therefore, it would have been obvious that the oversize or undersize particles are removed.

8. Regarding claim 5, Wheeler teaches that the final paste obtained after milling the metal contains about 55 to 80% by weight of metal content (column 2, lines 25-28; claim 9).

9. Regarding claim 6, Wheeler discloses that the coherent paste mixture of metal powder can be formed into pellet, granule, flake or beads (spherical) in order to provide good handling properties and optionally meterability (column 5, lines 49-52). It should be noted that Wheeler discloses the use of an organic binder as well (Abstract; column 1, line 67).

10. Regarding claim 7, Wheeler discloses that preferably the solid metal pigment composition is in a particulate form such that at least 98% by weight of the particles are retained on a British Standard Sieve having a 150-micrometer nominal aperture (column 2, lines 40-44).

11. Regarding claim 8, Wheeler discloses the formation of the paste to tablet, pellet, granule, flake or bead (column 5, lines 49-53). Therefore, although the reference does not expressly teach a length and thickness within the claimed ranges as recited in claim 8, it would have been obvious to make the granules having a length and thickness in the

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claimed ranges motivated by the fact that Wheeler discloses forming the paste into different shape as discussed in details above which have different thicknesses and sizes. Also, it is motivated by the fact that the main purpose of forming the paste into granule is to provide good handling properties; thus, it would be obvious to form granules in the desired and appropriate length and thickness depending on the application of use. Furthermore, it is motivate the fact that Wheeler discloses that pellets and granules are formed by forcing the precursor coherent paste through a number of suitably sized holds in a plate (column 5, lines 60-65).

12. Regarding claim 9, Wheeler discloses the evaporation of the liquid vehicle after the process has ended (column 5, lines 54-60).

13. Regarding claims 17 and 18, Wheeler discloses that the metal is aluminum, zinc, copper, nickel, tin, bronze, and other malleable metals and alloys and mixtures thereof; nevertheless, the reference discloses that the preferred metal pigments are of aluminum, bronze and zinc (column 3, lines 54-59).

14. Regarding claims 19 and 20, Wheeler discloses that the second largest dimension of the metal flakes used may be between 25 to 35 μ m (column 4, lines 9-11).

15. Regarding claim 23, Wheeler discloses the process of ball milling the metal flake paste (column 2, lines 19-20).

16. Regarding claim 24, Wheeler discloses the use of a low- or non-dusting, substantially non-volatile metal pigment composition in the milling process of aluminum metals in which any organic liquid which is chemically inert with respect to the metal powder and the binder material may be used as discussed in details above (column 1, lines 64-68; column 2).

17. Regarding claim 25, Wheeler discloses a metal pigment paste obtained in milling process using the disclosed milling media, containing an organic binder medium, as discussed in details above (column 1, lines 64-68; column 2, lines 19-20).

18. Regarding claims 26-27, Wheeler discloses forming the metal flake composition obtained in the milling process into tablet, pellet, granule, flake or bead to provide good handling properties (column 5, lines 49-52).

19. Regarding claim 28, Wheeler discloses the incorporation of the obtained metal pigment composition in the milling process, which may be formed into granules in an alkyd-hard resin primer system (column 8, lines 65-66), or formulating it in an ink system (column 9, lines 1-10; column 10, lines 22-27, 39-41).

20. Regarding claims 29-31, Wheeler discloses the injection moulding of the granulated metal pigment paste product (column 9, lines 44-55). Also, Wheeler

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discloses that the granule/pellets obtained may be mixed with pellets of PVC or acrylic polymers for injection moulding to provide moulded articles having a bright metallic appearance and in which the aluminum flake is uniformly dispersed (column 9, lines 67-69; column 10, lines 1-4).

21. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wheeler as applied to claim 1 above, and further in view of US Patent No. 4,588,474 to Gross in view of US Patent Application Publication No. 2002/0047058 to Verhoff et al.

22. Regarding claim 13, Wheeler discloses a process for producing a low- or non-dusting substantially non-volatile metal pigment composition by forming a coherent paste comprising an organic hinder medium, an organic liquid vehicle, and metal pigment, in which the organic liquid or the mixture of liquids is chemically inert with respect to the metal powder and the binder material (column 1, lines 64-68; column 2, lines 19-20, 62-68; column 5, lines 5-7).

Wheeler, although disclosing the use of polyalkylene glycol derivatives, is silent to the use of ethylene glycol, glycerin, or any of the specific compounds recited in claims 13.

Gross, also drawn to milling solutions for metals such as aluminum and its alloys, disclose the use of ethylene glycol and glycerin to the chemical milling solution to obtain a more effective milling solution specially for Al and its alloys (Abstract; column 3, lines

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12-22). However, Gross discloses the use of an aqueous solution whereas the instant application claims a non-aqueous milling fluid.

Verhoff et al., also drawn to milling process and milling media containing fluid carrier, solid substrate, additives and more, disclose that a milling media may or may not be aqueous; in other words, it may or may not contain water. The reference discloses that the liquid may be chosen from water, volatile non-aqueous liquids such as hydrocarbons, tetrahydrofuran, dioxin, and non-volatile solvents ([0001], [0219]).

Thus, at the time of the invention, it would have been obvious to modify Wheeler in order to include, specifically, ethylene glycol or glycerin in the milling media as that taught by Gross motivated by the fact that Gross discloses that ethylene glycol or glycerin create a more effective media in particular when milling aluminum and its alloys as discussed in details above and further motivated by the fact that as disclosed by Verhoff et al. the milling media may or may not be aqueous.

23. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Wheeler, Gross, and Verhoff et al. as applied to claim 13, and further in view of US Patent No. 3,511,648 to Garrett.

24. Regarding claim 14, the combination of references, Wheeler in view of Gross in view of Verhoff et al., disclose a milling process using a milling media which is non-volatile, non-aqueous as described in details above.

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However, the references as combined fail to disclose any of the milling fluids recited in claim 14.

Garrett teaches a composition for electrophotographic printing containing zinc oxide in which the zinc oxide undergoes ball milling using a milling fluid which contains dipropylene glycol; the reference further, discloses that an ether glycol such as propylene glycol methyl ether may be used in addition to other disclosed examples of ether alcohols (column 6, lines 66-75; column 7, lines 1-11).

At the time of the invention, it would have been obvious to modify the references as combined in order to include dipropylene glycol and in general, ether alcohol as a major component in the milling fluid as that taught by Garrett motivated by the fact that Garrett, also, discloses the ball milling of a metal so that the final product may be used in printing.

It should be noted that Garrett teaches the use of ether glycol, in general, and in another place, he discloses the use of dipropylene glycol.

25. Claims 3-4, 8, 10-12, and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wheeler in view of US Patent No. 6,398,861 to Knox and further in view of Verhoff et al.

26. Regarding claim 3, Wheeler discloses a process for preparing low or non-dusting substantially non-volatile metal pigment composition having a coherent paste

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comprising an organic binder medium, an organic liquid vehicle and metal pigment in powder or flake form (Abstract, column 1, lines 64-68). Also, Wheeler discloses that the composition can be used in wet ball milling (column 2, lines 19-21). Wheeler, moreover, discloses that any organic liquid or mixture or liquids which is chemically inert with respect to the metal powder and the binder material and which has a boiling point which is below the boiling point of any liquid binder used as such or formed by melting during removal of organic liquid vehicle may be employed (column 2, lines 61-68). In addition, the reference discloses the use of naturally occurring oils in the disclosed milling composition (column 4, lines 61-66).

Wheeler does not expressly disclose the use of a corrosion inhibitor.

Knox, drawn to a process for providing a low- or non-dusting, substantially non-volatile metal flake pigment composition in a ball milling process, discloses the use of one or more corrosion inhibitors and a substance which acts as a lubricant for the milling process (column 3, lines 47-54). Knox discloses that as corrosion inhibitors, inorganic phosphates are preferred (column 5, lines 32-35). However, Knox discloses the use of water in the milling fluid.

Verhoff et al., also drawn to milling solid material and milling process, disclose that the liquid in milling fluid may be chosen from water, volatile non-aqueous liquids such as hydrocarbons, alcohols and esters or a non-volatile solvent ([0001], [0219]).

It would have been obvious to a person of ordinary skill in the art to modify Wheeler in order to include the corrosion inhibitors and lubricants as that taught by Knox motivated by the fact that Knox disclose a substantially similar process and milling

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composition used for the same purpose of milling metals such as aluminum or gold bronze (column 3, lines 46-54; column 4, lines 57-62). Furthermore, Verhoff et al., also from the same field of art, discloses that the milling fluid may or may not be aqueous as discussed in details above.

27. Regarding claim 4, Knox discloses that unwanted oversize or undersize metal flake particles are removed by any suitable means (column 3, lines 55-56; column 6, lines 42-44).

28. Regarding claim 8, Knox discloses that the product obtained may be formed into different shapes such as granules having a length of 5-20mm, and a diameter of 1.5-3mm to offer optimum handling characteristics (column 7, lines 8-14).

29. Regarding claims 10-11, Knox discloses treating the obtained metal flakes with corrosion inhibitors such as phosphates (column 3, lines 46-54; column 5, lines 32-35).

30. Regarding claim 12, Knox discloses treating the obtained product at elevated temperature (column 3, lines 58-59).

31. Regarding claims 21-22, Knox teaches the use of phosphate esters (e.g. Briphos S2D) as both a lubricating and a corrosion-inhibiting agent (column 6, lines 18-20; Example 1). The reference further, discloses phosphorus compounds as corrosion

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inhibiting compounds (column 5, lines 1-5). Moreover, Knox teaches the use of mineral oils and oleic acid as lubricants (column 7, lines 1-3, 45-47).

32. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wheeler in view of Gross and further in view of Verhoff et al.

33. Regarding claim 2, Wheeler teaches a process for preparing low or non-dusting substantially non-volatile metal pigment composition having a coherent paste comprising an organic binder medium, an organic liquid vehicle and metal pigment in powder or flake form (Abstract; column 1, lines 64-68). Also, Wheeler discloses that the composition can be used in wet ball milling (column 2, lines 19-21).

Wheeler does not expressly teach the use of an alcohol.

Gross discloses a chemical milling solution for aluminum or aluminum alloys containing a diol or glycol such as ethylene glycol or glycerin (column 1, lines 8-11; column 3, lines 12-22). However, Gross disclose an aqueous solution.

Verhoff et al. disclose process of milling and a milling media containing fluid carrier, solid substrate, additives and more; the reference, further, discloses that the liquid may be chosen from water, volatile non-aqueous liquids such as hydrocarbons, tetrahydrofuran, dioxin, alcohols and esters and non-volatile solvents such as phthalates, and more (Abstract, [0001],[0219]).

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At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify Wheeler in order to include any of the alcohols as that taught by Gross and to use solvents except water as that taught by Verhoff et al. motivated by the fact that Gross discloses the use of such alcohols such as ethylene glycol and glycerin to make an effective milling solution of aluminum and its alloys. Also, motivated by the fact that Wheeler discloses that any organic liquid can be used in his disclosed milling fluid provided that it is chemically inert with respect to the metal powder and it is below the boiling point of any liquid binder (Wheeler, column 2, lines 62-68). Further, motivated by the fact that Verhoff et al. is also drawn to the milling process and milling media used for milling a variety of materials in which milling media may or may not contain water in addition to other components.

34. Claim 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knox in view of Verhoff et al.

35. Regarding claim 2, Knox teaches a process for preparing a low- or non-dusting substantially non-volatile metal flake pigment composition which comprising ball milling metal powder in a milling fluid containing water, corrosion inhibitor, and lubricant (Abstract; column 1, lines 5-10; column 3, lines 47-54). In addition, Knox discloses the use of, for example, additives such as lower alcohols (column 4, lines 15-18).

Furthermore, the reference discloses that an organic solvent, which is desirably water miscible, may be used as well (column 4, lines 25-26).

However, Knox discloses that the milling fluid contain substantial amount of water.

Verhoff et al. teach a process for milling a solid substrate and a milling media containing fluid carrier, solid substrate and other components and additives in which the liquid may or may not be aqueous ([0001], [0219]).

At the time of the invention, it would have been obvious to modify Knox to include a non-aqueous fluid as that taught by Verhoff et al. motivated by the fact that Verhoff et al., also drawn to the same field of endeavor of milling processes and milling fluids, disclose the use of either aqueous or non-aqueous liquids.

36. Claims 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knox in view of Verhoff et al. as applied to claim 2, and in further view of US Patent No. 5,849,072 to Sommer et al.

37. Regarding claims 15-16, Knox in view of Verhoff et al. disclose a low- or non-dusting, non-volatile, non-aqueous milling media, such as lower alcohol, for metal flake pigment composition, such as aluminum.

The references as combined do not disclose or suggest any of the specific milling fluid compounds recited in claims 15 and 16.

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Sommer et al., also drawn to metal pigment dispersion comprising flake form metal pigment produced by crushing and binding agent or binding agent solution in, for example, a ball crusher in which the metal may be aluminum, disclose the use of suitable solvents such as esters; Sommer et al., further, discloses the use of adipic acid in the solution as well (Abstract; column 1, lines 5-8, 19-25; column 3, lines 14-16, 49-50).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify Knox in view of Verhoff et al. in order to include adipic acids and esters of adipic acid in the milling media as that taught by Sommer et al. motivated by the fact that the choice of the suitable solvent and components in the milling media depends on the production process and purpose of use of the metal pigment (column 3, lines 54-60). It is, further, motivated by the fact Sommer et al. is also drawn to the milling of metal flakes such as aluminum.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pegah Parvini whose telephone number is 571-272-2639. The examiner can normally be reached on Monday to Friday 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on 571-272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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